Purity of the product is96.7%, the average molecular weight is $4.2x10^5$Da, the yield is 81.5%.

Example 5

Take 100ml of fermentation liquid of Alcaligenes entrophus, in which the dry weight of cells is 154g/l (in which content of PHBV is 80.5%); break cell wall with ultrasonic (2800W, continuous treatment) for 40min; adjust pH value to 11 with 30% NaOH solution; add 10kg of sodium laurylsulfate and 0.5kg of sodium polyacrylate; adjust reaction temperature to 50℃; react under agitation for 60min; filter with filter press; wash precipitate with water till washing becomes neutral; dry in oven at 70℃ to constant weight. Purity of the product is 97%, the average molecular weight is $5.3x10^5$Da, the yield is 84%.

Example 6

Take 100ml of fermentation liquid of Pseudomonas, in which dry weight of cells is 86g/l, content of PHBV is 61.5%; pretreat with ball mill (560r/min, 0.1mm steel ball) for 50min; adjust pH value to 11 with 30% NaOH solution; add 3g of sodium laurylsulfate; adjust reaction temperature to 24℃; react under agitation for 10min; filter with suction and filter paper; wash precipitate with water till washing becomes neutral; dry at 70℃ to constant weight. Purity of the product is 94.2%, the average molecular weight is $3.2x10^5$Da, the yield is 71.2%.

What is claimed is:

1. A method for directly separating and purifying polyhydroxyalkanoates in cells from bacterial fermentation liquid, comprisings:

(1) pretreating of the fermentation liquid with physical method to break cell wall;

(2) adjusting pH value of the pretreated fermentation liquid to alkaline;

(3) adding anionic surfactant and reacting under agitation;

(4) separating and extracting precipitate from the reaction liquid;

(5) washing and drying;

Wherein the sequence of adjusting pH and adding surfactant is interchangeable.

2. The method according to claim1, wherein coagulating agent can be added in the step (3).

3. The method according to claim1, wherein physical method can be selected from ultrasonic breaking, ball milling or high pressure treatment.

4. The method according to claim1, wherein pH of the pretreated fermentation liquid is adjusted to 8-13.

5. The method according to claim1 or 4, wherein the alkaline substance used to adjust pH is NaOH, Na_2CO_3, $NaHCO_3$ solid/aqueous solution or ammonia water.

6. The method according to claim1, wherein the anionic surfactant is olefin sulfonate, fatty alcohol sulfate, fatty alcohol polyoxyethylene ether sulfate, fatty alcohol polyoxyethylene ether or alkylphenol polyoxyethylene ether, its quantity is 0.5-20% (W/V) of the fermentation liquid.

7. The method according to claim1, wherein the coagulating agent is selected from sodium polyacrylate, modified starch or polyamine, its quantity is 0.5-20% (W/V) of the fermentation liquid.

8. The method according to claim1, wherein the reaction temperature under agitation is 10-70℃, the time is 5-60min.

9. The method according to claim1, wherein the method for separating and extracting precipitate from reaction liquid is selected from centrifuge, filter press or vacuum suction filtration.